Reliability and Validity of a Revised Family Disruption from Illness Scale in a Rural Sample

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Abstract

This study tests the validity and reliability of the 51-item Family Disruption from Illness Scale (FDIS) in a sample of 569 rural adults. The Family APGAR, the Family Discord Scale from the Family Invulnerability Test, and the Family Quality of Life Scale were used to validate the FDIS as a measure of the impact of illness upon family functioning. The alpha coefficient for the FDIS was .93, and the FDIS correlated significantly in the expected direction with all measures of family functioning: Family APGAR, r = -.23; Family Discord Scale, r = .32; FQOLS, r = -.28. A maximum likelihood solution with varimax rotation delineated seven interpretable factors. The FDIS offers a psychometrically adequate tool that is uncomplicated to administer for the evaluation of a family's disruption from illness. The study needs to be replicated in other rural settings, urban settings and with more culturally diverse populations.

Keywords: family functioning, reliability and validity, measure, illness, rural

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Sample

The Family Disruption from Illness Scale emerged because the first author was unhappy with what was available to measure the impact of illness upon the everyday functioning of families. The only measure she had been able to find was the Family Seriousness of Illness Scale (Bigbee, 1988, 1990), which is 200 items long and involves weighted items. It, in turn, derives from the Wyler Seriousness of Illness Scale (Wyler, Masuda, & Holmes, 1968). Both scales are complicated to use and the results are difficult to interpret. For example, the weights may not correspond with how the respondent sees the illness. There seemed to be a need for a simpler tool that would measure the burden of illness (Stein et al. 1987) for families.

The current scale derives from a basic premise from family systems and role theories that illness of a family member disrupts role function within the family system, resulting in perceptions of role insufficiency and conflicts (Doornbos, 1993; Fawcett, 1975; Hobbs, Perrin, & Ireys, 1985; Johnson et al. 1995; Testani-Dufour, Chappel-Aiken, & Gueldner, 1992; Williams, Lorenzo, & Borja, 1993; see also, Kane, 1997, p. 23, on "social functioning" as a domain of health-related quality of life). This has also been supported in the literature on family coping during illness crisis (Engli & KirsivaliFarmer, 1993; Johnson et al. 1995; Koller, 1991) and that on the impact of daily hassles on individual functioning (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Kanner, Coyne, Schaefer, & Lazarus, 1982; Wagner, 1990; Wagner, Compas, & Howell, 1988). The notion is also inherent in Olson's (1997) work on family stress and coping and the work of McCubbin and McCubbin (1993).

This study examines the reliability and validity of a Family Disruption from Illness Scale (FDIS) that had previously been tested with a small sample of rural residents and revised (Ide,

1996). The items were drawn from a 30-item symptom list used for older adults in Ide's dissertation (1979). At that time it was scaled in terms of perceived change in symptoms over time. In the mid-80s the symptom list was revised, scaling it according to frequency of difficulty with symptoms, for a study of older widows in Tucson, Arizona (Ide, Tobias, Kay, Monk, & De Zapien, 1990; Kay et al. 1988). Further items were added, and it was recently used for a needs assessment of rural veterans (Ide, 1994). The previous versions of the symptom scale had focused on older adults. In order to measure disruption to family routines caused by illness across life stages, it was necessary to add items and change the scaling. Faculty in nursing and family & consumer sciences checked the resulting scale for content validity, and the first version was tested with 161 adults in Fall 1995 (Ide, 1996). This resulted in the current 51-item scale.

Methods

In November 1996, 600 surveys were distributed at the annual flu clinics in Laramie, Wyoming, a city of about 30,000 population. The final sample consisted of 569 respondents who completed usable questionnaires and were aged 18 and over (out of a total of 583 returns). The age range of the sample was 18-88, 54% were 40-64 years of age, 2/3 were females, 79% had greater than a high school education, and over 1/3 saw their income as inadequate. The latter characteristics were to be expected. It is usually the mother who takes children to a flu clinic, Laramie is a college town, and Albany County, of which Laramie is the largest city, has the second lowest per capita income of Wyoming counties (Department of Administration and Information, State of Wyoming, 1994). The ethnic makeup of the sample is typical of the area, with 92.4% Caucasian and 4% Hispanic.

Instruments Used for Validation of the FDIS

Three instruments were used in validating the FDIS as a measure of the impact of illness upon family functioning. The Family APGAR (Smilkstein et al. 1982) consists of five items that measure a respondent's perception of family functioning. Originally developed as a clinical tool, Good, Smilkstein, Good, Shaffer, and Arons (1979) noted a split-half reliability coefficient of .93 and a correlation of .80 with the Family Function Index (Pless & Satterwhite, 1973). Moos and Moos (1981) reported an alpha coefficient of .84, a correlation of .54 (p. = .01) with the FACES III cohesion sub-scale, and a correlation of -.40 (p. =.01) with Family Environment Scale. We found an alpha coefficient of .80 in this sample. Two of the instruments developed by McCubbin and associates were also used. The Family Discord Scale from the Family Invulnerability Test (McCubbin, Olson, Lavee, & Patterson, 1985; McCubbin & Patterson, 1987 is a 4- item Likert scale that assesses the extent to which families worry, have the same problems over and over, are critical of each other, or have difficulty accomplishing what they want to do. Previous reported internal reliabilities were .67 (McCubbin et al. 1985) and .75 (Ide, Carson, & Araquistain, 1997). For this sample, the alpha coefficient was .78. The Family Quality of Life Scale (FQOLS), a 10-item self report measure in a Likert-type format developed from the original 40-item scale that was part of the Family Inventories of McCubbin and associates (Olson et al. 1985) assesses the degree of satisfaction with various aspects of family life. Previous alpha reliability was .76, and its correlation with the original 40-item scale, which had sound psychometrics, was .82. In previous testing, we found an alpha coefficient of .75; internal reliability was .79 for this study.

Scores were high to medium on the Family APGAR (range = 5-15; mean = 13.43) and the FQOLS (range = 22-77; mean= 43.63), and Family Discord scores were low (range = 4-20;

mean = 10.71). Over 70% almost always had help from the family, saw the family as helping

them solve problems and as expressing a wish to change, and were satisfied with their family and

living arrangements. The 65 and over group reported the highest family discord scores but also

had the highest scores on the Family APGAR and FQOLS.

Family Disruption from Illness Scale

The revision of the FDIS tested consists of a 51-item list of common symptoms and

health problems. Scaling is according to the respondent's perception of the degree to which a

symptom or problem has caused a disruption in the family's daily or work routines during the

past three months: 0 for no difficulty, and 1 to 4 for symptom or problem present and caused no,

minor, moderate, or major disruption in routines. Respondents are asked to circle 0 if a member

of their family had not had any difficulty with a problem. If a symptom or problem had

occurred, then they were to circle the appropriate number referring to their perception of the

degree of disruption. The most frequently identified symptoms (noted by 30-40% as disrupting

routines) were allergies, colds, forgetfulness, headaches, pain, difficulty sleeping, tiring easily,

and vision problems.

Results

The overall degree of disruption noted by this community sample was generally low.

The range of scores was 0-133 with a mean of 25 and a median of 19. The alpha coefficient for

the FDIS was .93, which might be partly a function of the length of the scale and partly due to

the homogeneity of this rural sample. The latter is a phenomenon we have seen before when

testing tools in rural samples. Concurrent validity was generally good. Although the correlation

coefficients were not high, the FDIS correlated significantly in the expected direction with all

measures of family functioning: Family APGAR, r = -.23; Family Discord Scale, r = .32;

FQOLS, r = -.28.

Factor Analysis

The purpose of the factor analysis was to identify the latent dimensions or constructs

represented in the original variables (Hair, Anderson, Tatham, & Black, 1998). A 7-factor

maximum likelihood solution generated the fewest nonredundant residuals (11% >.05), resulted

in a good fit (chi-square = 1903.48; p = .000), and explained 36.3% of the variance. The Scree

plots confirmed the 7-factor solution. A varimax rotation was chosen because of the need for

orthogonal factors in other analyses (Tabachnick & Fidell, 1990). Table 1 shows the loadings

for the seven factors, with loadings of .30 or greater considered relevant.

Table 1
Facting Loadings (Minimum criterion for selecting loading = .30)

Factor 1		Factor 2		Factor 3		Factor 4		Factor 5		Factor 6		Factor 7	
Suspicious	0.7	Headache	0.59	Incontinent of stool	0.63	Anxiety	0.8	Forget-fullness	0.56	Surgery	0.53	Shortness of breath	0.5
Suicidal thoughts/ acts	0.67	Allergy	0.51	Diarrhea	0.54	Depression	0.64	Memory loss	0.52	Menopause problems	0.51	Feet swelling	0.46
Mental Illness	0.64	Tire easily	0.44	Gas pains	0.49	Nervousness	0.58	Hearing problems	0.52	Uterus/vaginal problems	0.43	Difficulty walking	0.44
Behavior problems	0.59	Pain	0.44	Urinary problems	0.43	Difficulty sleeping	0.44	High blood pressure	0.43	Pregnancy	0.4	Heart trouble	0.38
Loss of appetite	0.48	Cough	0.39	Constipation	0.39			Vision problems	0.39	Cancer	0.4		
Difficulty communicating	0.4	Skin rash	0.38	Noise in the ear	0.39			Stroke	0.36				
		Cold	0.37	Skin sores	0.38			Prostate problems	0.31				
		Stomach problems	0.36	Dizziness	0.31								
		Infection	0.31										

Factor 1 could be called Behavioral Symptoms (alpha = .82). The items consistently

loaded on one factor, and seemed to consist of "external" rather than "internal" symptoms,

referring to actions or behaviors that result from psychological problems. Factor 2 we called

Acute Episodic Symptoms (alpha = .76), those minor illnesses that are acute and intermittent. The items with high loadings on Factor 3 (alpha = .80) were a combination of gastrointestinal and urinary symptoms along with noise in the ear, dizziness, and skin sores. A phrase that seemed to describe the combination was Frustrating Symptoms. Factor 4 (alpha = .80) consists of four symptoms that always loaded on one factor no matter what solution was used. We called it Anxiety/Depression, although it could also be termed the "worry" factor. Factor 5 (alpha = .73) consists of the Functional/Sensorineural symptoms that often are thought of as problems that could accompany the aging process. Factor 6 (alpha = .67) consists of symptoms, some of them relevant for women's health, that seem to herald the necessity for some type of Change in Lifestyle. Finally, the highest loadings on Factor 7 (alpha = .66) were for a combination of Cardiovascular and Respiratory symptoms.

Not unexpectedly, there were eight items that loaded across two factors, six with loadings of greater than .30 on the second factor. Difficulty communicating loaded across the two psychosocial symptom factors, with a loading of .40 on Behavioral Symptoms and .35 on Anxiety/Depression. Two items, infection and dizziness, loaded almost evenly across two factors, although the loadings were only in the .30 range; infection had loadings of .31 on Acute Episodic Symptoms and .30 on Behavioral Symptoms. Dizziness loaded at .31 on both Frustrating Symptoms and Behavioral Symptoms. Two had secondary loadings on the Functional/Sensorineural (or aging problems) factor, noise in the ears (.36) (which can be a side effect of certain blood pressure medications) and heart trouble (.33). Although surgery loaded most clearly on the Changes in Lifestyle factor (.53), it also had a .33 loading on the Frustrating Symptoms factor. Eight items (seizures, teeth problems, injury, anemia, asthma, illness of a pet,

diabetes, and multiple sclerosis) were eliminated by the procedure, resulting in a 43-item final scale.

Discussion and Conclusions

Family health promotion is a critical element of primary health care. Each family system develops its own pattern of problem-solving and decision-making involving health matters. These patterns are seen in the lifestyle of the family and are shaped by the family's philosophy of health as well as its internal and external environment. Given the chronic strains experienced by many families, ways to deal with disruptions caused by the illness of one of its members can be critical in assisting these families to achieve healthy ways of living.

A psychometrically adequate tool that is uncomplicated to administer is critical for the evaluation of a family's disruption from illness. Adequate representation of the phenomenon under study requires a sound theoretical model and a match between the statistical procedures and the aim of the analysis. Instrument testing, although not the easiest form of research, is essential to advancing the science of nursing. Each of these important elements has been addressed in this research and the revision of the original tool.

This study should be replicated in other rural settings, urban settings and with more culturally diverse populations. An important extension would be a comparison of the effect of acute and chronic illness disruptions on the family.

The instrument tested in this study offers a less complex but reliable tool to measure the disruption to family routines caused by the illness of family members. It is a different approach to measuring health at the "family" level. This approach could be extremely helpful to nurse practitioners as well as nurse researchers. Nurses in the practice arena are often reluctant to become involved in research because of the time involved in measuring illness characteristics.

They would be more likely to become involved if simple, easy to use instruments such as this were available.

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